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THE

Soybean Digest



Official Publication

OF

THE AMERICAN SOYBEAN ASSOCIATION

VOLUME 5 • NUMBER 12



OCTOBER • 1945

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THE *Soybean Digest*

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GEO. M. STRAYER, Editor

KENT PELLETT, Managing Editor

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No. 12

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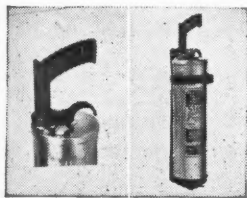
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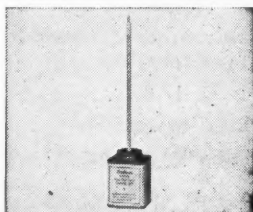
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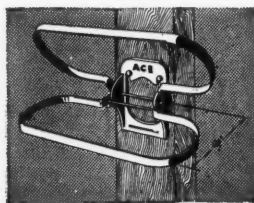
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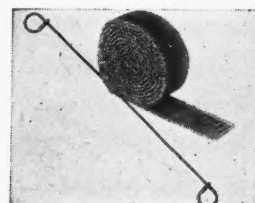
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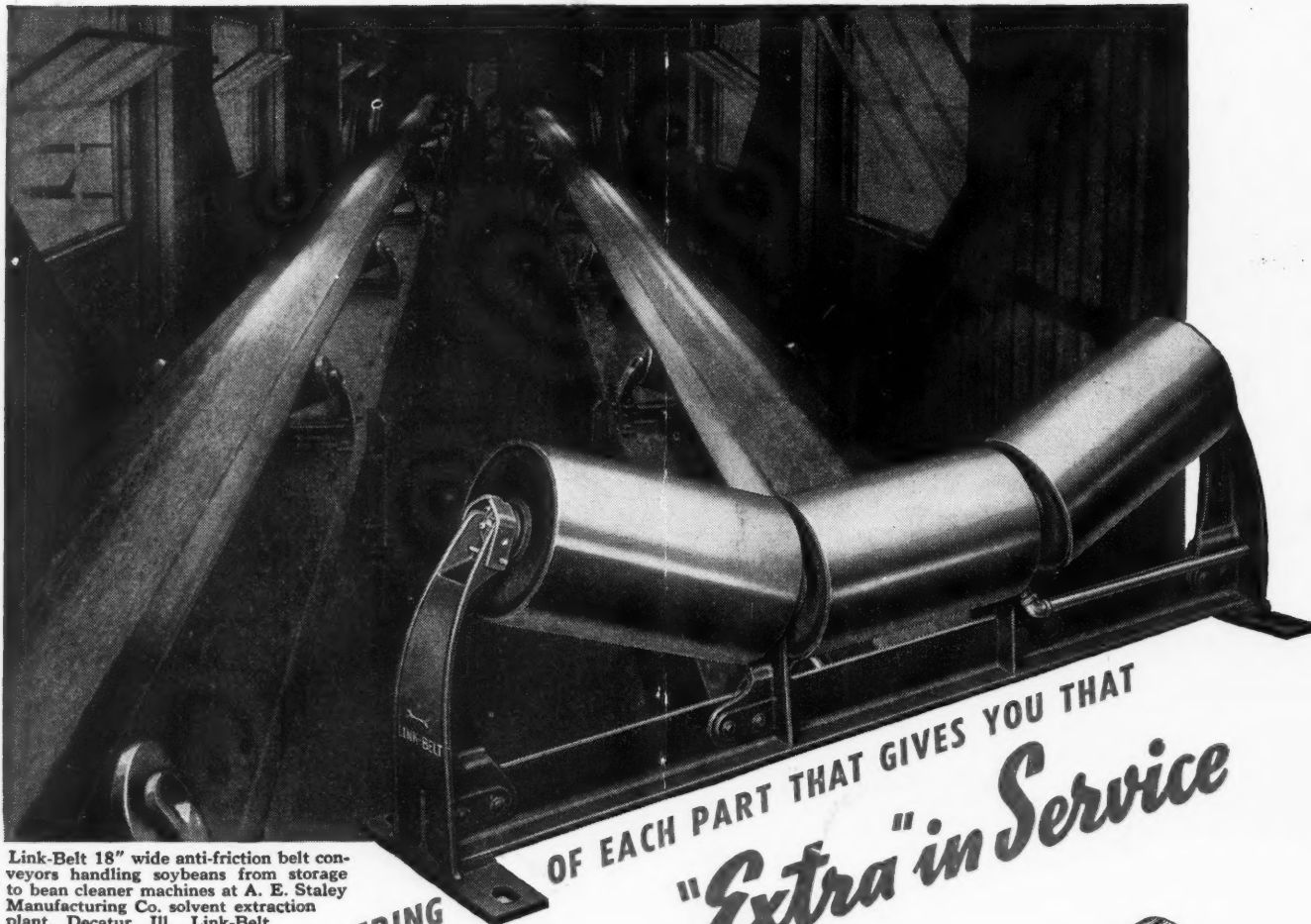
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SOYBEAN DIGEST





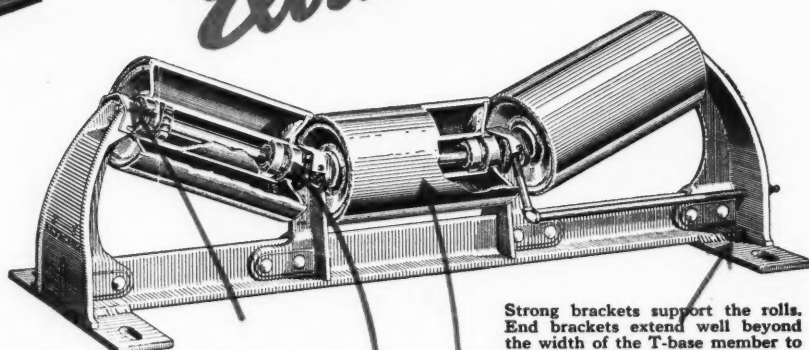
Link-Belt 18" wide anti-friction belt conveyors handling soybeans from storage to bean cleaner machines at A. E. Staley Manufacturing Co. solvent extraction plant, Decatur, Ill. Link-Belt "100" idlers are used with grease pipe extension to one side.

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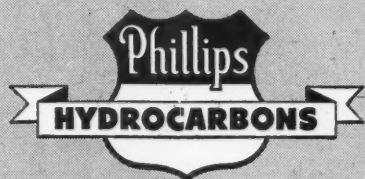
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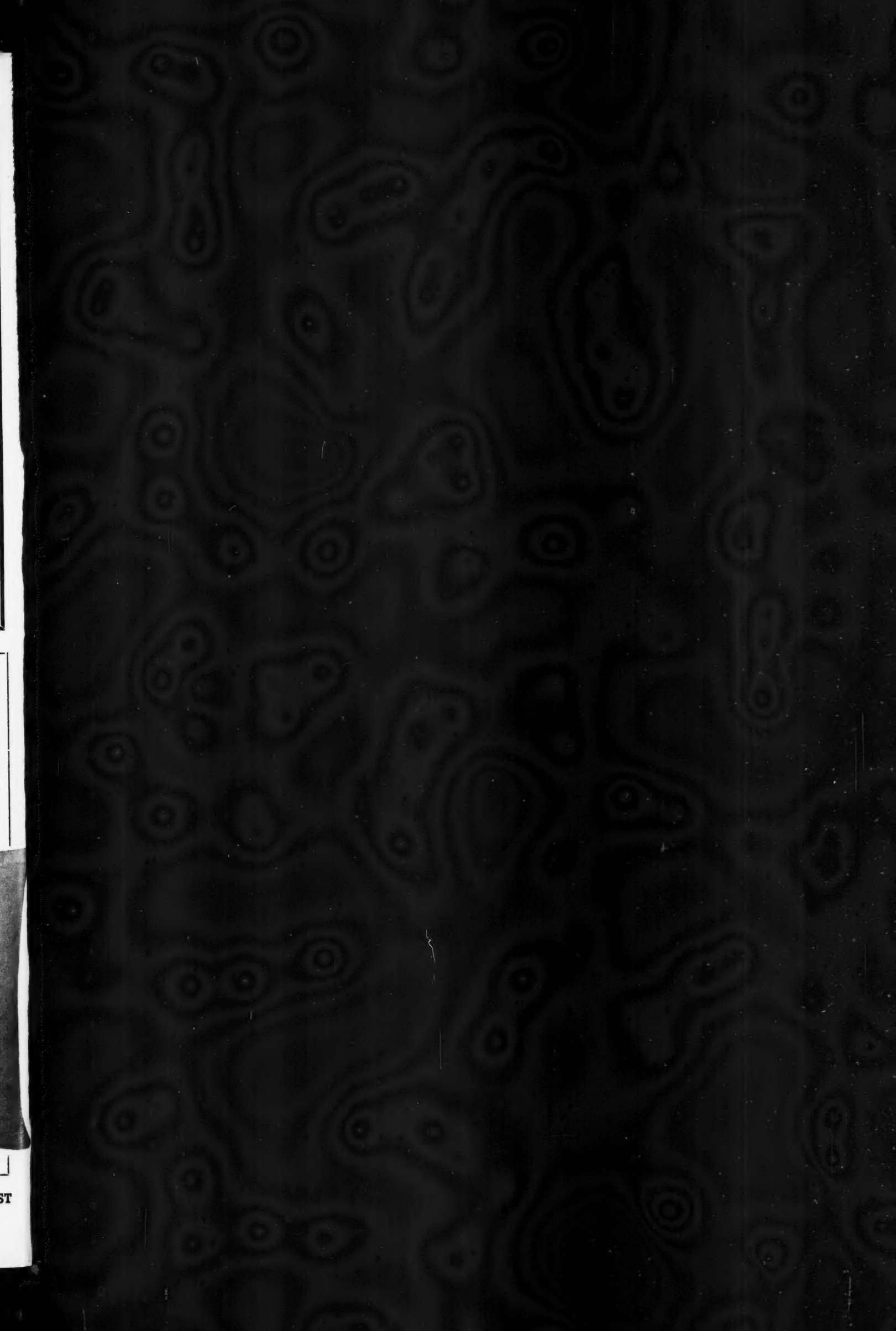
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QUIT STARVING SOYBEAN RESEARCH!

✱

✱

✱

During the war years the Midwest states have been blessed with a crop that produced on fewer acres greater quantities of edible fats and oils and valuable protein than America's breadbasket has ever produced. Soybeans have solved many of the problems of the war. Farmers have adopted them with open arms because war-stimulated prices have been favorable.

State agricultural colleges and experiment stations instituted research work on soybean varieties, cultural practices, storage, and utilization before the war—but on a very limited scale. Shortage of manpower has reduced that research to inconsequential proportions during war years. Energetic, resourceful, scientific-minded young manhood has been drafted for the Army and Navy without thought of scientific research. Soybean research in most Midwest states today is shameful as compared with that of other crops. Possible alibi is the relative youthfulness of the crop as compared to corn, oats, wheat, vegetable and fruit crops.

* * * *

Now—the fall of 1945—the spring of 1946—is the time to revise college and experiment station thinking and bring it up to date in recognition of wartime developments. Research programs designed to increase our knowledge of production and utilization of soybeans should be instituted immediately—utilizing the young manhood which is now beginning to trickle from our armed services. Instead of one man who spends only a part of his time on soybean varietal work, the second most important cash grain crop of the Cornbelt should rate the best brains of several resourceful men in each state. Soybean processing methods merit extensive research. Soybean storage studies are still in their infancy. Soybean oil utilization in the Midwest area has never had the consideration which it merits. Soybean protein studies have only been scratched, in both the feeds and industrial fields. Commercial fertilizers, defoliation, canning and freezing, insect pests and diseases, production machinery

—they are only a few of the phases of the industry demanding early attention.

The crop which now produces the second largest portion of the farm income of the Midwest states merits far more consideration from experiment station directors than it has ever received in any state, with the possible exception of Illinois. To the directors of those agencies—to the planners and the policy-makers of the state institutions which reputedly lead the agricultural thinking of the Midwest because of their state and federal financing as land-grant colleges—we suggest immediate revision of plans and programs to utilize the crop which we have at hand—and the manpower which is again becoming available to do the type of research work in the agricultural field which has made the United States the winner in the field of warfare.

* * * *

As servants of the public, college and experiment station men are eager and willing to serve the interests of the taxpayers of their respective states. Secure and smug in their salaried positions which are not dependent upon weather and crop conditions, college men sometimes lose sight of the things which are important to the average farmer at the moment. It is our job—yours and mine—and *it does mean you*—to express in person or by letter to the director of the experiment station in your state your views on the need for soybean research—now. And further, it is your job to assist in any way possible the planning of that work.

Today we have an opportunity which may never again be presented to us. Let's utilize the education, the training, the inquisitiveness, the eagerness, the lack of defeatism and the supply of confidence of the returning G. I. and the Gob to initiate research programs, on a statewide scale, of which we may be proud. And let's see that our legislatures provide the funds with which to do it! In so doing lies the future of the soybean industry in the heart of America.

NORELAC

A NEW RESIN DERIVED FROM SOYBEAN OIL

By **L. B. FALKENBURG**
and **J. C. COWAN**

Northern Regional Research Laboratory 1/
Peoria, Illinois

SOYBEAN OIL offers an excellent domestic source of raw material for chemical and related industries because it is normally produced in large quantities at a relatively low cost. This oil contains 45 to 55 percent linoleic acid, a di-unsaturated fat acid, as one of its major constituents. Contemporary research is now engaged in attempts to produce new chemicals from this linoleic acid. One solution to this problem is the polymerization of soybean oil and its subsequent separation into different fractions.

Previous work on the polymerization of soybean and related oils has conclusively demonstrated that in the process of heat-bodding, the linoleic and linolenic fat acid radicals unite through their unsaturated linkages to form polymeric fat acids containing dimers, trimers and possibly higher polymers. These acids were shown to be polyreactive and, therefore, are capable of undergoing polymerization reactions with other polyreactive chemicals. The polymeric fat acids are similar in their chemical properties to phthalic and maleic anhydrides, sebacic, and other dibasic acids. Because of this similarity, the polymeric fat acids may find many analogous uses such as plasticizers in alkyd resins for paints and varnishes, and in other protective coatings for which the dibasic acids are produced industrially in large quantities.

Investigations at the Northern Regional Research Laboratory on the polymeric fat

1/ One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

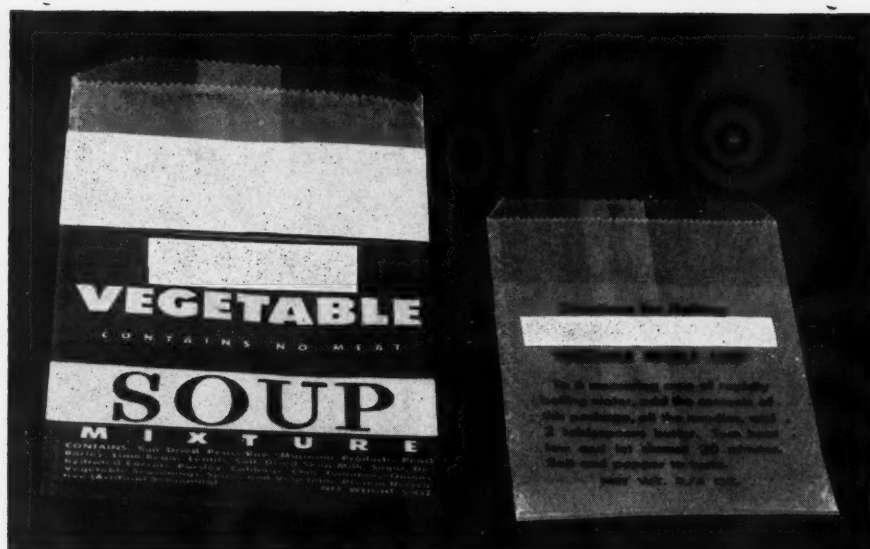


Figure 1. Glassine bags.

acids of heat-bodied soybean oil have led to the discovery that new and useful materials could be prepared from these acids by polymerizing them with certain polyreactive reagents. For example, polyesters can be prepared by reacting these acids with ethylene glycol, a material which is sold in large quantities as a nonvolatile antifreeze. These polyesters may be mixed with certain rubber compounding reagents and treated to give a superior rubber replacement. This development was pioneered by this Laboratory, and it led to the commercial production of Norepol[‡] for a short period in 1942-1943.

In a manner similar to the preparation of these polyesters, the polymeric fat acids may be reacted with polyamines which are closely related to ammonia. When ethylene diamine is employed as the amine, a new and useful resinous material is produced. Chemically, it is known as the ethylene diamine polyamide or polymeric soybean fat acids; for convenience, we have called it Norelac[§].

PROPERTIES

Norelac is a hard, transparent, thermoplastic resin. It can be prepared with melting ranges varying from 98° to 116° C. and in colors ranging from light yellow to dark brown. It is compatible with a large number of other synthetic and natural resins, such as, rosin, ester gum, phenolics, nitrocellulose, and damar.

As a polyamide, its solubility characteristics are unusual. It dissolves in alcohols, amines, fatty acids, and certain

[‡]From Northern Regional POLYmer.

[§]From Northern Regional LACquer.

chlorinated hydrocarbons. However, it is insoluble in esters, ethers, glycols, ketones, hydrocarbons, and nitroparaffins. While Norelac is insoluble in hydrocarbons, its alcohol solutions will tolerate large volumes of these solvents, therefore making available a wide range of inexpensive diluents.

Norelac has been shown to have good film-forming properties. When films are cast from solution, they dry by solvent evaporation, with the drying rate depending on the volatility of the solvent. As is readily noted from an examination of Table I, Norelac films possess excellent resistance to water, alkalis, and acids.

In addition, films of Norelac possess excellent adhesion to many surfaces and have exhibited good outdoor durability on both wood and metal. Some of these films have been exposed outdoors at Peoria, Ill., for over a year and a half and are still in good condition.

Furthermore, it was found that the addition of a small percentage of paraffin wax to Norelac imparts moisture impermeability to the resulting films. A thin film cast on paper from a Norelac solution containing 2 percent paraffin exhibited an exceedingly low rate of water-vapor transmission—the value obtained compared very favorably with most organic coating materials now in use.

POTENTIAL AND ACTUAL UTILIZATION

In view of the properties inherent in Norelac, it should find many applications as a protective coating for wood and me-

TABLE 1. Tests on Norelac films[†]

Cold Water	Hot Water	4% Acetic acid	20% Sodium hydroxide	75% Sulfuric acid
7 days, unaffected	5 minutes, white; after 15 minutes, softened	15 days, unaffected	8 days, unaffected	7 days, discolored but otherwise unaffected

[†]Different samples of Norelac will vary somewhat in their resistance to certain reagents depending on the method of preparation, et cetera.

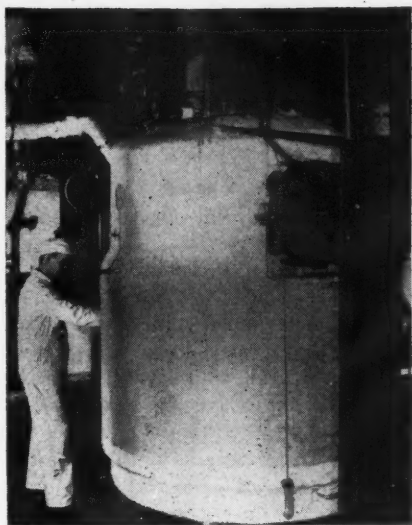


Figure 2. Medium size kettle for production of Norelac.

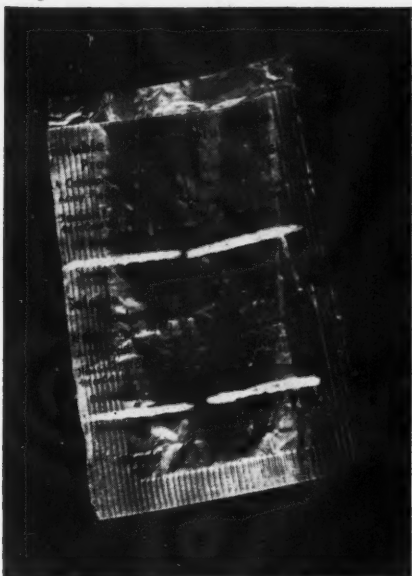


Figure 3. Aluminum foil pouch.



Figure 4. Package of cheese coated with a Norelac composition.

tallic surfaces. It can be used alone or in combination with other resins as a spirit varnish or lacquer. Further, Norelac may be readily pigmented either in solution with a ball or pebble mill, or in the "dry" state. Pigmented solutions of Norelac make excellent rapid drying enamels having outstanding durability. It should also be mentioned that Norelac solutions make superior vehicles for aluminum or bronzing powders.

Since Norelac is thermoplastic and possesses excellent adhesion, it can also be used as a laminating and heat-sealing agent for paper, glassine, cellophane, vinyl films, and metallic foils. With Norelac, a wide variety of laminates, such as glassine-to-glassine, lead foil-to-sulfate paper, Cellophane-to-Cellophane, et cetera, can be prepared. These laminates, using Norelac as the bonding agent, compare favorably with commercial materials now in production; for example, the aluminum pouch shown in Figure 3, which was made from a sheet consisting of a film of printed cellulose acetate laminated to aluminum foil with Norelac. The foil side was coated with Norelac to provide the necessary heat-sealing coating for pouch formation.

Norelac is now being employed as a heat-sealing agent for the production of bags and pouches used in the packaging of various food products, viz., dehydrated soups, gelatine desserts, et cetera. Two such bags, illustrated in Figure 1, were made from uncoated glassine using Norelac as the sealing agent. Norelac is also being used today as a sealing agent for spot liners in bottle caps.

The compatibility of Norelac with resins, waxes, and plasticizers facilitates the formulation of various compositions which should be useful in dip-coating operations. For example, the cheese package shown in figure 4 was covered with a Norelac composition containing wax, re-

sin, and plasticizer. This coating protects the package as it offers an excellent barrier to water, is greaseproof, and retains its flexibility at refrigerating temperatures.

PRODUCTION OF NORELAC

The commercial production of all materials necessary for the preparation of Norelac has been shown to be feasible, and little difficulty is expected in any large-scale operations. Its production on a semi-commercial scale has already been accomplished by two companies. A view of a kettle operated by one of these companies for the production of Norelac is shown in Figure 2.

Norelac is now selling for approximately 45 cents a pound, but the price is expected to fall as production expands and soybean oil becomes more abundant.

The technical aspects of the preparation, evaluation, and utilization of Norelac are discussed in the following publications:

- Cowan, J. C., Lewis, A. J., and Falkenburg, L. B. *Oil and Soap* 21, 101-7 (1944)
Cowan, J. C., Schwab, A. W., and Falkenburg, L. B. *Modern Packaging* 17, 113-9 (May 1944)
Falkenburg, L. B., Teeter, H. M., Skell, P. S., and Cowan, J. C. *Oil and Soap* 22, 143-8 (1945)
Hovey, A. G. *Modern Plastics* 22, 125-6, 192 (May 1945)

— s b d —

JUBILEE ISSUE

To the Editor:

Just a line to let you know I greatly appreciate your good paper and what it is doing for the industry.

The number of the *Digest* you put out giving the history of your work and its progress was excellent. At this time soybeans are filling a great need.

PAUL FURMAN,
Stoneham, Mass.

We are still getting comments on our *Silver Jubilee* issue. —Editor.

SOYBEAN CULTIVATION ENCOURAGED IN FRANCE

Although production of soybeans in France is on a small scale at present, their cultivation has been officially recognized by the provisions of a resolution, effective in July 1945, that permits farmers who must deliver specific amounts of vegetable oilseeds to the government to fulfill such obligations in whole or in part with soybeans, reports *Foreign Crops and Markets*.

Soybeans were not commercially produced in France until 1943 when about 2,500 acres were grown in family gardens for food and another 5,000 for livestock feed. The figures for 1944 were 6,000 and 8,500 acres respectively. Estimated acreages for the current season are approximately the same as those of last year. Unsatisfactory weather conditions in 1944 reduced the yield per acre and producers lost some of their enthusiasm.

Total production of soybeans has not been officially estimated. Apart from those grown in gardens and consumed directly in the household the 1944 crop may have been from 75,000 to 100,000 bushels. While it is expected that production may increase some during the next few years, it is doubtful if the output will ever reach any sizable proportion. Under normal conditions, soybeans could be imported from the Far East much more cheaply than they could be grown in France. During the years 1933 to 1937 imports of soybeans averaged 850,000 bushels, coming chiefly from the Far East. The United States, however, supplied 46 percent of the total in 1938. Soybean oil, imported from other European countries, averaged about 4 million pounds annually.

The Future of SOYA FOODS

By L. S. STUART

Senior Marketing Specialist, Grain Branch,
Production and Marketing Administration,
U. S. Department of Agriculture

THE SOYBEAN product used most extensively in foods is soybean oil. During the past year, there has been a continuation of the increased demand for soybean oil to be used in food products. Some idea of the tremendous influence of the war on the American soybean industry can be gained from a study of the figures given in Table I on the production and consumption of refined soybean oil.

These figures show that production of refined soybean oil in 1944 was 3.2 times that of the prewar level of 1939. Total factory consumption increased over this period by about the same ratios as production. Use in shortening and margarine has increased by about three times the 1939 prewar level and use in other edible products has increased by 4.6 times. It is especially interesting to note that use in miscellaneous food products is now at a level of about two times that of prewar usage in margarine. Inasmuch as about 95 percent of the total factory consumption during the war period was used in foods, it can readily be seen that the immediate postwar future of the industry at least is contingent upon a continuation of heavy demands for soybean oil from the food industries.

AT PEAK LEVELS

There are quite strong reasons to believe that these demands will continue at wartime levels for not less than 1 year following the conclusion of the war. The levels at which they will tend eventually to be stabilized are at present highly problematical. With a continuation of improvements in the world shipping situation and cessation of hostilities in the South Pacific, intense competition from other vegetable oils may be expected. Every effort should be made now, while demands are at peak levels, to improve methods of refining and processing soybean oil so that food processors can depend upon it to produce end products of the desired



• A large number of new outlets should mean a growing market for soy foods.

quality standard. If this is done, then the industry may well expect to hold many of the gains made during the war period and add to some of them.

Total production of soy flour and soy grits has been maintained during the past year at a fairly constant level of about 25 million pounds every 3 months. About 60 percent of the total production has been consumed in domestic trade channels. This represents an increase in domestic consumption of 2.4 times that of the 25 million pound 1941 prewar level.

Present day sales to domestic food manufacturers are based almost exclusively on what might best be described as "functional values." The nutritional story, having been found to possess but little positive value from the standpoint of sales appeal, has now been assigned a purely secondary role. Increasing emphasis is being placed on such factors as color, grind, solubility of protein, bacterial count and baking properties.

Soy flour processors are actively study-

ing the ingredient needs of the various food trades and modifying their products to meet these needs. Thus, we find a rather wide variety of soy flours and soy grits being manufactured to meet specific demands. Among these products are thermophile free packers' grits for use as a sausage binder, bleached full-fat flours for use in bakery white goods, unbleached full-fat flour with high protein solubility for use in bakery sweet doughs, bleached defatted flours of very fine grind and high protein solubility for use in both bakers' white goods and crackers, and toasted flours and fine grits for use in dry soup and dry stew mixes.

GAINS ARE SIGNIFICANT

In the face of all these specialty developments, it is especially interesting to note that retail sales of expeller process multipurpose flour in consumer packages are reported by the industry as having shown small but significant gains since June of 1944.

Since the increased volume of domestic business has been built up on a purely voluntary basis in direct competition with other available food ingredients, it seems fairly safe to assume that it can be considered, in a large part, as permanent business and not purely as a war induced expansion.

Exports of soy flour and grits during the war period have been very erratic. This can best be illustrated by listing total Lend-Lease shipments of the various types of soy flour and soy grits for semiannual periods since June 30, 1942. This is done in Table II.

The totals for the different periods given in Table II vary by as much as nearly 900 percent. It is virtually impossible to make any prediction as to the postwar demand for exports from figures of this kind.

It is probable that shortages in world supplies of high quality protein foods will make the use of these products, in fairly large volume, imperative in relief feeding programs both in the European and Pacific areas during the next 12 or 18 months. The size of the permanent export market

TABLE 1. Production, Factory Consumption and Use in Food Products of Refined Soybean Oil*

Year	Total Production 1,000 lbs.	Total Factory Consumption 1,000 lbs.	Use in Food Products 1,000 lbs.			
			Shortening	Oleomargarine	Other Edible Products	Total
1939	350,827	321,587	201,599	70,822	32,345	304,766
1940	387,748	375,881	212,317	87,106	39,980	339,403
1941	446,321	402,724	215,967	75,634	47,976	339,577
1942	649,231	570,056	335,555	133,346	60,857	529,758
1943	1,027,622	941,424	568,405	198,020	124,562	890,987
1944	1,133,099	1,021,454	620,257	211,105	150,192	981,554

*Taken from Bureau of Census Reports

Table 2. Total weight in shipments of soy flours and soy grits under Lend-Lease.

Period	Total Wt. Pounds
July 1, 1942, to Dec. 31, 1942	36,252,332
Jan. 1, 1943, to June 30, 1943	58,814,941
July 1, 1943, to Dec. 31, 1943	122,189,122
Jan. 1, 1944, to June 30, 1944	64,657,600
July 1, 1944, to Dec. 31, 1944	14,347,600
Jan. 1, 1945, to June 30, 1945	46,938,450

that will eventually develop will depend largely upon the impressions created during relief feeding periods. It seems important, therefore, for the industry to expend every effort to have selected products delivered according to the methods of utilization planned.

Although no actual total production figures are available, it is quite apparent that interest in wet processed products is developing rapidly. Nearly all large soybean food processors are now producing, either in pilot plant operations or in commercial quantities, one or more products of this type primarily for the confectionery or bakery trades. Production methods vary widely. In some instances, the products appear to be patterned after the so-called "Korean type" soybean milk. In others, the end product is primarily an isolated protein usually spray-dried. Products of the latter class are, on the whole, so bland as to be practically tasteless and can be whipped or used in the preparation of a variety of emulsified food items. Domestic consumption of both spray-dried and canned soybean milks has increased markedly during the war period.

Figures on the volume of trade in dry edible or vegetable varieties of soybeans, for consumption as beans as differentiated from varieties grown for crushing for oil, are very incomplete. Most of this trade is in the hands of seed companies. It is interesting to note, however, that approximately 500,000 pounds of such soybeans have been sold during the past 12 months apparently for export to Puerto Rico and the Philippine Islands.

One important food outlet for soybeans that might well be receiving more attention from processors is soy sauce. Before the war, the United States produced about 1 million gallons per year of this soybean and wheat product and about 2 million gallons were imported from the Orient. With the curtailment of imports, the domestic market has been flooded with many low grade and cheap imitation Worcestershire sauces. The better grades of these sauces contain as much as 30 percent soy sauce. There would appear to be therefore, a substantially expanded market for soy sauce if domestic Worcestershire could be standardized at some minimum quality level.

RELIEF PROGRAMS

In the immediate future, relief feeding programs should begin to take concrete form. The protein contained in most of the soya foods referred to herein makes them especially valuable as ingredients for many of the prepared foods that will be used in these programs. In fact, the existence of a world shortage of protein foods possessing high nutritional quality will probably necessitate this type of

(Continued on page 13)



A 10-pound New Zealand Doe with her two-months old litter that weighs 28 pounds.

SOYBEAN OIL MEAL IN

Rabbit Feeding

By GEORGE S. TEMPLETON

Director, U. S. Rabbit Experiment Station
Fur Resources, Division of Wildlife Research

An extensive research program has been conducted at the U. S. Rabbit Experiment Station at Fontana, Calif., to determine the value of plant protein supplements in rations for domestic rabbits, the amounts to be used for optimum production, and the best method for feeding the products. These studies emphasized the fact that rabbits require considerable protein in their rations. Properly-fed litters of rabbits doubled in live weight the first seven days following birth and up to weaning time when two months old their weight was increased 28 times. Ten-pound does that received a properly-balanced ration and produced four litters in 12 months, had young, that when weaned at two months of age, equalled 10.8 times their dam's live weight.

BIG PROTEIN EATERS

Rapid development and heavy production require large quantities of protein. In fact, in the case of domestic rabbits, much larger quantities are now being recommended in the ration than were formerly considered necessary. For best feeding results and development, rations fed to dry does, herd bucks, and developing young should contain 12 to 15 percent protein, and those fed to pregnant does and does with nursing litters should have a protein level of 16 to 20 percent. The larger quantities of protein recommended for the two types of rations give better results than smaller quantities.

Soybean oil meal, pea-size cake, and the pelleted oil meal have all proved to be desirable for adding the proper quantities of this protein-rich supplement to a basal ration of grain, legume hay, and green feed. Their addition has increased the live weight of the young, when weaned at two months of age, 13 to 20 percent, and has made a saving in feed costs of 20 to 25 percent.

Soybean oil meal can be used in rations in the mash or pelleted form. Rabbit's mouth parts are not adapted for eating finely ground food so the mash mixture should

be dampened slightly previous to feeding. This will prevent the oil meal from separating out, settling to the bottom of the feed trough, and being wasted.

PELLETED FEEDS

The pea-size cake or the pelleted oil meal are desirable for making up rations that contain whole or milled grains, and supplements in either of these forms are especially desirable for use in full-feeding does and litters by the selective feeding method. For feeding rabbits, pellets should be 3/16 to 4/16 of an inch in diameter and 1/4 to 1/2 of an inch long. The smaller dimensions are preferred. When larger pellets are used, there is considerable waste, especially with small rabbits, for when they are unable to get the pellet in their mouth and bite it in two, they are likely to drop a portion. If the animals are being maintained on the self-cleaning type of hutch floor, the feed is lost; if they are being maintained on the solid floors, there is the objection of the food being dropped on the solid floor and becoming contaminated.

The soybean milling industry has a responsibility to acquaint itself with the type of product that the rabbit industry requires and to make its products available to the breeders. At present this is a sizeable market and it has great potentialities. While there are no dependable figures available as to the rabbit population of the United States, rabbits are being raised successfully in every state in the Union. Dependable information does establish the fact that in excess of 13 million pounds of domestic rabbit meat were consumed in Los Angeles, Calif., in 1944; the consumption in Denver, Colo., was one and one-half million pounds. During the past two years rabbit production has increased and in a great many places has increased from 200 to 300 percent during this time.

Rabbits are destined to become a more and more important factor in supplying the meat requirements of this country and proper utilization of plant protein supplements will contribute towards making their production more profitable.



HAYWARD

SOYBEAN PRODUCTS FOR DAIRY CATTLE

By L. B. CORMAN
and
J. W. HAYWARD

Members Soybean Research Council

FEED comes before food in our national economy. To the dairy farmer this means that soybean oil meal must be fed before the nation and peoples of the world can have milk and butter. The implication here is that soybean oil meal must be a very important feed ingredient for dairy cattle. This is true and was manifested more clearly during World War II.

Soybean products are used in various ways for dairy cattle. Soybeans can be grazed in the field as forage. The mature or nearly mature plants can be cut for soybean hay or silage. The soybean can be harvested for seed or grain and fed as such in limited amounts to dairy cattle and dairy calves. Lastly, the most important outlet for soybeans is commercial processing wherein the oil is removed and the resultant by-product, soybean oil meal, made available for feeding purposes.

During World War II it had been imperative that soybeans as beans be made available to processing mills for the removal of oil so necessary for the war effort. Domestic production of fats and oils had almost equalled in importance that of rubber as a critical war material in which the U. S. has become largely self-sufficient. The great demand for soybean products resulted in consistent increases in the farm price for soybeans. The price moved from the 1935-39 average of 95 cents per bushel to \$2.13 as of March 15, 1945. With this favorable price farmers

currently harvest about 75 percent of the planted soybean acreage for soybeans as seed or grain, the majority of which eventually reaches processing channels. During the crop year October 1943 through September 1944 approximately 3.5 million tons of soybean oil meal were produced. This represented 43 percent of the total vegetable protein concentrates produced in the United States. In this classification of vegetable protein concentrates we include such items as cottonseed, corn gluten, linseed, copra, and peanut oil cakes and oil meals.

During the year 1944, soybean oil meal constituted about 40 percent of all the oilseed meals consumed by dairy cattle. It was consumed in greater quantity than any other oilseed meal. Soybean oil meal has become so universally distributed that every commercial dairy herd in the United States is at least a potential consumer of some of it every year. This popular protein concentrate is not a regional product. It is produced primarily in the Central States but enjoys favorable transportation rates to most points in the United States.

The principal nutritional merit of soybean oil meal is that of supplying protein to off-set the deficiencies of cereal grains which constitute a large portion of the total ration for milking cows. Soybean oil meal contains some 41 to 46 percent protein of which about 90 percent is digestible. The total digestible protein in soybean oil meal is approximately four

to five times that of cereal grains. When used primarily as a protein concentrate, soybean oil meal is incorporated in dairy cattle grain mixtures at levels of 10 to 25 percent. This does not mean that higher levels cannot be fed, for soybean oil meal is so palatable that dairy cattle will consume as much as 18 pounds per head daily for extended periods. Such feeding experiments have been under the supervision of authorities in dairy cattle nutrition and the effects of such high levels of soybean oil meal have always been very satisfactory.

The amount of supplementary protein required by dairy cattle is governed largely by the kind and quality of roughage available. There is a significant trend to improve pastures and hays for all livestock. This is characterized by a shift to legumes and earlier cutting of roughage which together contribute significant amounts of protein to the ration. The importance of good quality roughage in meeting the dairy cow's protein needs is illustrated by the following schedule for recommended levels of protein in the grain mixture.

	Recommended Percent Protein in Grain Mixture
Roughage	
Legume hay and/or Legume Silage or excellent pasture	12 percent
Legume Hay and Corn or Sorg. Silage or good pasture	15 percent
Mixed or Non-Legume Hay and/or Corn or Sorg. Silage or fair pasture	17 percent

Although oil meals have always been liberally used in calf meals or starters, this outlet has been greatly expanded in recent years. Prices on fluid milk have been so favorable to dairy farmers that there has been an urgent need for calf meals to replace fluid milk for young calves. Instead of feeding skim milk or whole milk in various combinations to calves up to 4 to 6 months of age, the tendency in many areas is to gradually reduce and discontinue the feeding of liquid milk at any time from 2 weeks on up to a maximum of 6 weeks. During this period the calf is changed from liquid milk feeding to a dry ration in which soybean oil meal usually predominates as

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a protein concentrate. Soybean oil meal can replace milk in this respect because it is so palatable and the quality of protein is similar to milk protein. The amount of fluid milk that has been saved or conserved for human use through this plan has been of tremendous importance in meeting the total food budget of our country.

With the conclusion of the present global war, international trade in soybean oil meal will be extended to almost every country. Even now there is considerable trading in soybean oil meal as a feed ingredient for export to the European area. Soybean oil meal also has been one of the principal ingredients in complete dairy mixtures purchased for export.

Thus we see that the use and popularity of soybean oil meal is worldwide. This popularity certainly is deserved in view of the exceptional nutritional properties of this relatively new protein concentrate.

This is fifth of a series of special articles by well-known nutrition authorities on livestock and poultry. —EDITOR.

— s b d —

STUART

(Continued from page 11)

usage. Although much experience has already been gained in this field with such items as pea-soya dry soup mix, dry stew mix, cereal concentrates, buckwheat porridge and pork-soya links, a great deal remains to be done if the industry expects to capitalize fully on this potential outlet. There are still old prejudices to be overcome, improvements to be made in existing formularies and new uses to be developed.

The advent of peace and the relaxation of wartime restrictions will necessitate many readjustments within all food industries. The soya food industry will be no exception in this respect. However, as a very young industry, with the growing pains of expansion still prodding it on, the necessary adjustments should be made rapidly and the new course of progress quickly charted.

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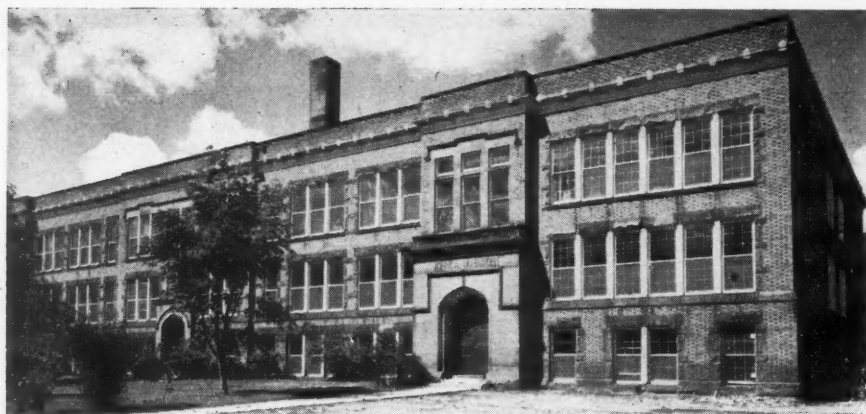
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With many departments already in operation the new Archer-Daniels-Midland Co. research laboratory takes its place as one of the leading centers of American research. Primarily devoted to the vegetable oil and nutritional fields, the modern facilities of the new laboratory will permit a great expansion of activity.

Utilization of the entire 3100 block on 38th Avenue South in Minneapolis, the new Archer-Daniels laboratory has over 40,000 square feet of space. Room controlled air conditioning, the most modern types of equipment and scientific lighting have been installed.

Biological research and development on soybean products will be under the personal direction of Dr. J. W. Hayward. Research on soybean oil and lecithin in the paint and industrial fields will be directed by S. O. Sorensen.

Widely known as crushers of oil seeds and refiners of vegetable oils, the Archer-Daniels-Midland Co., founded over 106 years ago, now occupies a leading position both as a prime supplier to the protective coating industry and as processor of agricultural products.



Soybean Field Day at Ames

Above is part of the crowd of over 500 which attended the corn and soybean field day at Iowa State college agronomy farm September 14. This was one of several such field days held at the various state experiment stations in September.

Squatting between the bean rows is R. R. Kalton, who is in charge of U.S.D.A. test plots in Iowa. Man in the straw hat stepping forward is Dr. L. F. Williams, associate agronomist with the Bureau of Plant Industry at Urbana, Ill.

Soybean plots examined by the visitors were the fertilizer and variety tests, and the plots where the simulated hail damage experiments are being carried on.

Prof. J. C. Eldredge, I. J. Johnson and A. J. Englehorn as well as Kalton took part in the plot demonstrations.

URGES COOPERATION YEAST FOOD AND SOYBEAN INDUSTRIES

The cooperation of the food yeast and soybean industries in producing high-protein and vitamin foods for low income groups would be of great benefit to the health of this and other countries, Dr. Barnett Sure, professor of agricultural chemistry at the University of Arkansas told members of the pioneer section of the American Association of Cereal Chemists at Wichita, Kans., September 8.

At the same meeting Emery C. Swanson of the department of milling industry, Kansas State College, discussed the addition of soy flour to wheat flour.

Dr. Sure, who is the discoverer of Vitamin E, has been experimenting with the addition of yeasts to the diets of white rats for years. He has found that the addition of even small amounts of yeast to cereal diets greatly increased the growth and reproduction of the rats. Blending enriched flour with 5 percent yeast produced 150 percent increase in growth and 57 percent increase in biological value.

"The introduction in the daily diet of highly nutritious yeasts in cooking and baking may prove of global significance in improving the nutritional status of large populations in various parts of the world," particularly in India, China and Japan where the populations are often forced to subsist on near starvation diets, he said.

ARE TOO COSTLY

Realizing that their cost would have to be appreciably reduced if they are to be used in large quantities, he experimented with supplementing the yeasts with soy flour in cereal diets.

Of these experiments Dr. Sure said: "I found that blending enriched flour with 1 percent and 3 percent solvent-extracted soybean flour produces almost as good growth as with the equivalent of brewers' yeast. Therefore, it is evident that blending wheat flour with small amounts of brewers' or cultured yeast and soybean flour would furnish proteins of high biological value as supplements to wheat flour and at the same time would provide an abundance of the vitamin B complex through food. Such procedure would result in considerable reduction in cost, because the soybean flour is much less expensive than any of the debittered or cultured food yeasts.

"The blending of wheat flour with dried yeasts and soybean flour would be particularly beneficial to families of low income levels whose diets are derived largely from cereal grains containing proteins of low biological value. Such blending should be considered by the baking industry with the objective of obtaining a more nutritious bread."

Save Field-Damaged Soybeans

A digest of U. S. Department of Agriculture leaflet A-W-71.

If the fall season is unfavorable, soybean growers should be prepared to protect their harvests from weather damage that may result from late plantings.

HOW TO HANDLE A LATE CROP

1. Cut the crop immediately it is ready. Frosted soybeans may combine very well if frost is followed by dry weather. But don't risk the weather too long.

2. To facilitate handling and to keep down moisture content, harvest frosted or rain-damaged beans as late in the day as practicable.

3. Use every precaution to keep down the moisture content, especially if it already exceeds 13 or 14 percent. Spread the beans thinly on bin floor and turn often. If there is much chaff or dirt, have them cleaned, or send them to a commercial elevator that has facilities to care for them.

4. Beans may be dried artificially by using forced air at moderate temperatures. High temperatures will dry them; but under too rapid drying they will lose in test weight

and may suffer a lowering of grade or a loss of viability.

Save seed from fields that mature first and from varieties best adapted locally. Give them the best storage possible.

GREEN DAMAGE

When growth is arrested prematurely, soybeans that would be yellow if normally matured are green when harvested, and this condition is popularly known as "green damage" or frost damage. These soybeans, however, are in fact damaged only when the degree of injury is sufficient to lower the quality of the oil. This type of damage causes little trouble in the extraction of the oil by the expeller method, but it does cause some additional expense in refining, owing to the green color of the oil.

WEATHER DAMAGE

If not harvested promptly after maturity, but left exposed to rains and damp weather for a time, soybeans develop a dark-brown color and a mealy or chalky texture, and they tend to sprout and decay. This, is

known as weather damage, rain damage, or field damage. Among other types of injury are heat damage, disease damage, and insect damage.

From the standpoint of the processor, field damage is much more objectionable than "green damage." Field-damaged beans wear out processing equipment very rapidly and contribute in many other ways to higher plant-operating costs. Although damaged soybeans usually contain as much oil as those that are sound, normal yields of oil cannot be obtained.

Field-damaged beans usually carry considerable soil or dirt, which rapidly wears out the expellers and makes filtering the oil more difficult. Furthermore, the oil that is obtained from damaged soybeans is inferior in quality and cannot be sold to the refiner at regular prices. These three factors — operating difficulties, decreased oil yields, and lower value of the oil — lower the value of damaged beans for processing.

The refiner receiving dark-green or highly colored oil from damaged beans must increase the quantity of bleaching earth, and also the time of treatment, and must employ various other expedients to obtain the light oil that will be accepted by his customers. Even if the refiner is able to produce a satisfactory oil from the standpoint of color, it may be of poor keeping quality because of the high percentage of free fatty acid and the treatments he has used.

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AUSTRALIAN STUDIES U. S. BEAN CROP

Donald Shand, special agricultural investigation officer of the Commonwealth of Australia, recently made an inspection of the U. S. soybean industry. Mr. Shand left Australia on May 21 and arrived in the United States two days later, flying time from Sydney to San Diego occupying 40 hours.

Mr. Shand runs a "small" farm of 4,500 acres in the New England section of New South Wales. He has been growing navy beans, hybrid sweet corn, plants for pyrethrum, vegetable crops, opium poppies, and several other special crops. His farm is located on the New England Plateau about 350 miles north of Sydney. He has been particularly active during the emergency in organizing the WASPS (Women's Agricultural Security Production Service). This is an entirely volunteer organization which aids the farmers in producing the various crops.

VAST AREAS SUITABLE

Commenting on the possibilities of Australian soybean production, Mr. Shand said, "We have numerous, vast areas suitable for the cultivation of this crop and experiments have proved that the soybean will flourish. Up to the present, however, only small tests have been made and approximately 200 acres is grown in the whole Commonwealth. Since the outbreak of war, Australia has made great progress in row farming and it is possible that the soybean may develop on similar lines 'Down Under' as it has in the U. S. A."

Mr. Shand said that Australian farmers were facing similar problems to those in America and the ideas of row crop farming in the U. S. were being applied in numerous areas which, before the war, were considered only sheep walks. He was notified by his government recently



DONALD SHAND

that more than 300 farmers have indicated their desire to cooperate in testing the varieties which he is sending back.

The rapid development of the soybean industry in America is one worthy of the highest praise and is an outstanding example of what co-operation between the agricultural scientists, manufacturers and farmers can do, says Mr. Shand. Their co-operative efforts have been of inestimable value to the war effort and the contribution that soy will make to peace is still a matter of conjecture. Its versatility unknown and its by-products are so numerous that scientists freely admit that the crop has unlimited scope for development, he believes. Mr. Shand paid a special tribute to the kindness extended to him by Dr. W. J. Morse, whose untiring efforts in the soybean industry have meant much to its development.

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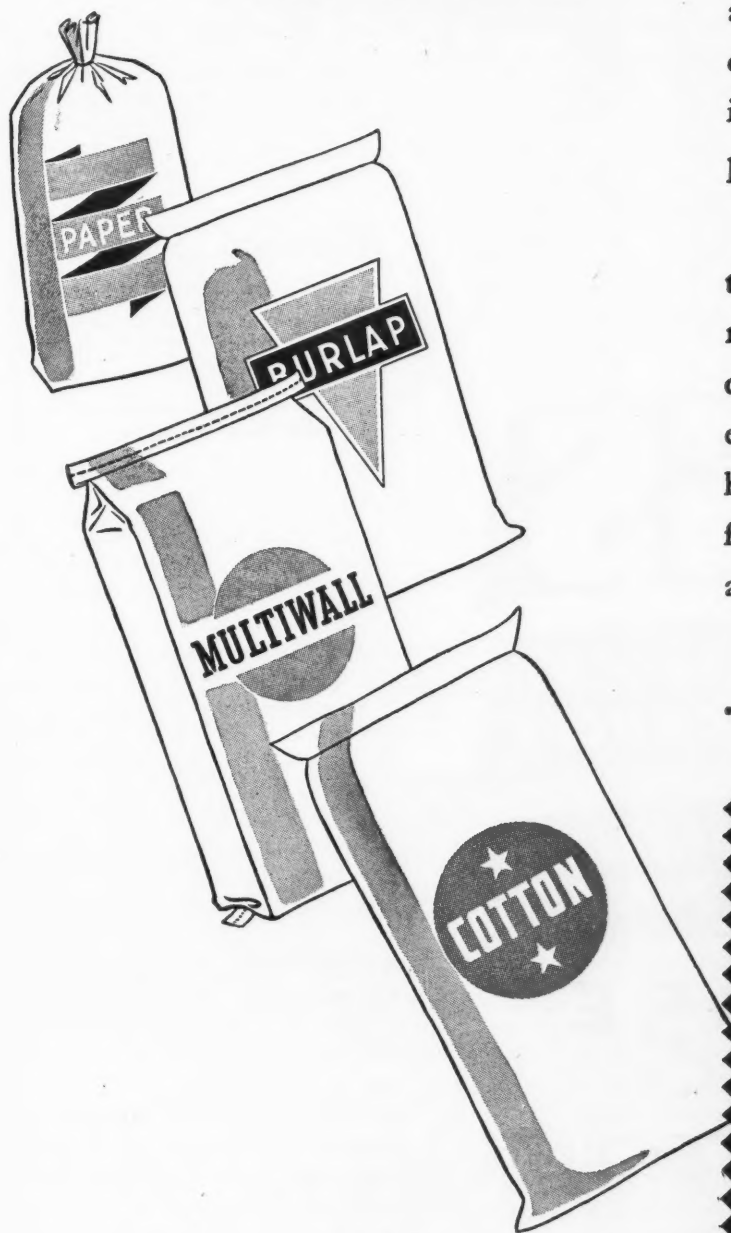
*Analysis of Soybeans
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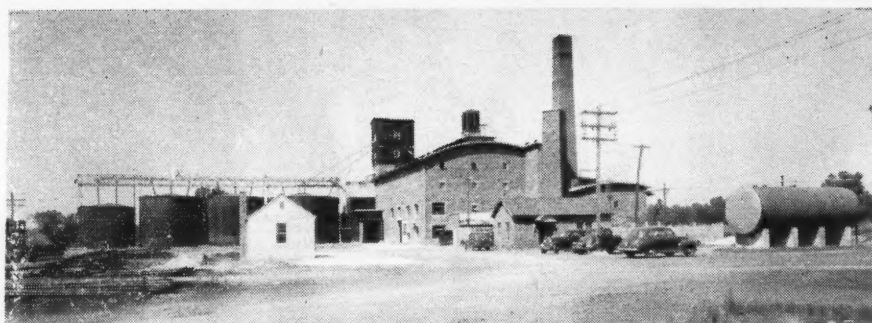
Probably the most important question now before the soybean producer is: How much of the war expansion can be maintained on a profitable basis in the future? state R. F. Gurtz and C. E. Burkhead of Bureau of Agricultural Economics in *The Agricultural Situation* for September.

"Regardless of the adverse factors regarding the crop such as competition from both domestic and imported vegetable oils, there is a bright side," say Gurtz and Burkhead. "Rapid strides are being made in the development of new varieties adapted to specific areas. Farmers can be assured that progress and better yielding varieties, new uses for soya products for both food and industrial purposes, will all aid the producer in the coming years. Facilities for processing soybeans have greatly expanded during the war years.

"Even with the war in the Orient over, it may be many years before soybean production in that area can meet more than local demands, with little for export.

"It seems reasonable to expect that expanded uses of soybeans and soybean products will maintain the soybean as one of America's principal crops, at least in the immediate years ahead."

The nation's leading soybean county, Champaign, Ill., may be due for some acre-



New Plant at Portland, Ind.

Haynes Soy Products Co., Inc., Portland, Ind., held formal open house at their plant, shown above, September 17. The plant was purchased from the Portland Tile Corp., and remodeled for expeller processing.

Work began in September, 1944, and the firm commenced operations July 3. Processing capacity is 1,800 bushels daily. Storage tank capacity is 65,000 bushels.

Clarence E. Peters is president and general manager of the new firm. Plant superintendent is Harry H. Van Kirk.

age reduction in soybeans, a poll taken of farmers attending a Farm Bureau-Farm Management service tour in that county September 8 indicates.

Virtually all farmers present said they had started a reduction this year and will carry it further. In addition to complaints that soybeans contribute to erosion on hilly land, flatland farmers say that soybeans complicate their weed control problems. Oats and clover acreage may increase.

It was generally agreed that soybean acreage in Champaign County will remain large. At the present time it is not significantly less than that of corn.

Market Street

We invite the readers of **THE SOYBEAN DIGEST** to use "MARKET STREET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here.

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SOYBEAN DIGEST

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FOR SOYBEANS AND SOYBEAN PRODUCTS

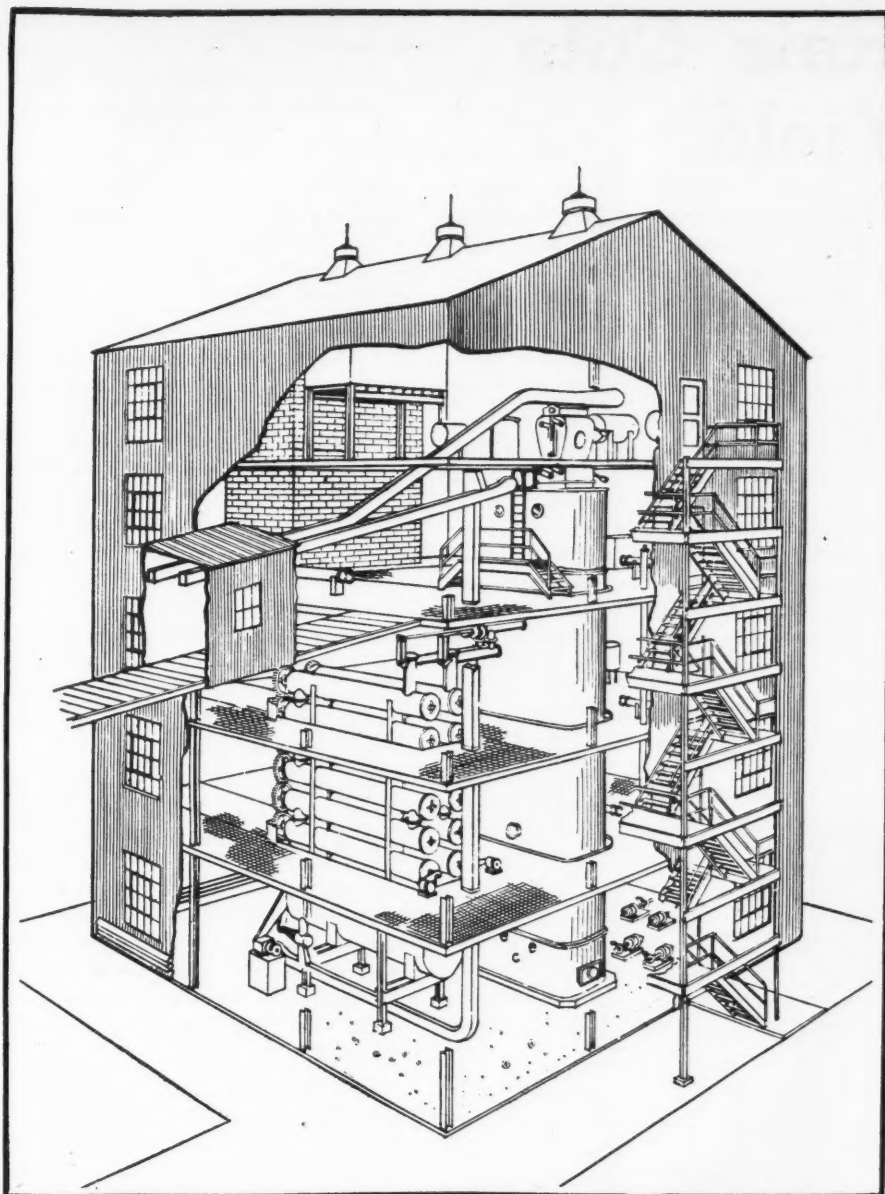
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Too Much Rain Cuts Estimated Yield

Rainy, cool weather during September cut the U.S.D.A.'s crop reporting board estimate of 1945 soybean production to 196,587,000 bushels, a 3 percent drop from the 202,589,000 bushels indicated a month ago. However, the estimate is still about 2 percent above last year's crop.

There were no reports of extensive frost damage from September frosts in leading soybean states. However, wet fields and more than the usual number of weeds in many sections forecast a possible difficult harvesting season. Significant disease damage is reported from some localities. Early harvested beans tested high in moisture.

Indicated soybean production in the 15 major states: Ohio, 22,591,000; Indiana, 28,640,000; Illinois, 73,062,000; Michigan, 1,815,000; Wisconsin, 676,000; Minnesota, 6,460,000; Iowa, 36,195,000; Missouri, 10,770,000; Kansas, 2,612,000; Virginia, 1,581,

000; North Carolina, 2,088,000; Kentucky, 975,000; Tennessee, 1,232,000; Mississippi, 1,131,000; Arkansas, 3,875,000.

October 1 reports of *Soybean Digest* correspondents follow:

ARKANSAS

Tildon Easley, extension agronomist, Little Rock: Some of earliest beans just beginning to mature. Crop looks good at present but information on actual yield not yet available. Not enough storage in some areas.

Jacob Hartz, Stuttgart, for east central: No frost yet. Too much rain delaying maturity of early varieties. Indications point to wet harvest. Ample rain during growing season assures normal or above yields.

CONNECTICUT

J. S. Owens, agronomy department, University of Connecticut, Storrs: Maturity week late. Yield for forage 25-50% higher than

1944. Moderate Mexican bean beetle damage to crop.

ILLINOIS

J. C. Hackleman, department of agronomy, University of Illinois, Urbana, for central and northern: Many fields weedier than normal. Some exceptionally good fields. Anticipated yield not much different than that of 1944. Considerable disease reported. Bud blight and stem rot both prevalent. Grasshoppers also took toll.

G. H. Iftner, Illinois Agricultural Association, Chicago: Have had so much rain and cloudy weather beans have not had opportunity to mature as should. If this weather continues, bean producers will undoubtedly face another difficult harvesting season. Another problem is presence of weeds in many fields. Particularly true of drilled beans. Weeds will mature later than beans and in all probability will add to moisture test, dockage and foreign material.

Gilbert F. Smith, Newman, for east central: No frost yet. Looks like 5% disease damage. Some early fields of Richland and Earlyana cut. Not enough storage unless railroad cars available.


Russell S. Davis, Clayton, for west central: No frost yet. Bulk of crop safe from anything except hard freeze. Ten inches rain in September. Fields very soft but beans standing up well. Looks like yields 75% of normal. Will be cut most by too late planting. Most of leaves off early planted fields. Balance of crop turning yellow so looks like most would be merchantable. Killing frost would reduce size of berry but hasten harvest.


J. E. Johnson, Champaign for Champaign and adjoining counties: No killing frost to date. Not over 2% crop would be seriously damaged by frost. Damage from excessive moisture resulted in heavy disease damage, sterility, and a marked amount of popping. Can expect heavy shatter loss. Do not expect quality of 1944 due to excessive rainfall with many fields lying flat on the ground and weediest in our experience. Yield of large percentage of fields will be reduced 25-50% by weeds. Many fields must wait until freezing weather before wild millet, our worst weed hazard, can be combined. Yield lower than earlier estimates. Estimators haven't inspected fields to see lack of podding and fewer beans per pod together with disease and weed situation. We have much to learn about efficient production. We say too much about certain varieties and overlook that fitting the variety to the job is the key to efficiency of production. There is no best variety. Each has its place. It is the wise grower who can fit the variety to the job. Available storage much increased over 1944.

Frank S. Garwood & Sons, Stonington, for south central: No killing frost to date. Disease damage probably 10% or more. Beans will probably grade poorer than 1944 due to weeds and wet weather. Many soy-



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beans down and will probably show considerable damage from wet September weather. Yields less than earlier estimates.

INDIANA

Peter J. Lux, acting chairman Indiana AAA, Indianapolis: 90% matured before killing frost. Very little frost damage if any. Some flood damage. Beans will grade excellent. Farmers ready to harvest as soon as weather will permit. Yield well above normal in many sections. During last week has rained an average of inch a day in many sections. Producers have combines in some fields but no hope of getting into gear until have several days of sunshine. A few fields of early varieties harvested week before last. North half of state reports prospects of best crop ever.

J. B. Edmondson, Clayton, for south central: No frost yet. 90% beans out of danger after Oct. 10. Very slow start beans got in spring due to wet and cold never overcome. Yield 5-10% lower as result. Quality should be high from present indications. Plants standing well, shorter than normal and not weedy. Lincoln beans showing up well, podded heavily, standing well, but probably lower yield than 1944. Distinct tendency for all varieties to pod closer to ground this season, which will necessitate careful combining to prevent loss.

K. E. Beeson, Indiana Corn Growers Association, West Lafayette: Soybeans unusually weedy which may delay combining, especially if grass is abundant. Yield prospects, however, are generally good.

IOWA

A. J. Loveland, State AAA, Des Moines: Frost damage 5% to yield, 1% to quality. 5% damage by other conditions. Beans will grade good and harvesting prospects good. Yield will be 98% of normal. Adequate storage available.

I. J. Johnson, Iowa State College, Ames: 85-90% matured before killing frost which occurred in northern half of state Sept. 28. No need for alarm at harvesting prospects at this date. Yield slightly higher than normal. Estimated 21 bu. per acre.

John Sand, Marcus, for northwest: Many fields have excess weeds due to late, wet season. Most beans exceptionally tall but apparently not quite so heavily podded as normal.

KANSAS

E. A. Cleavinger, extension division Kansas State College, Manhattan, for eastern: No killing frost yet. Crop 50% matured. Yield cut by Aug.-Sept. drought. Harvesting prospects good. Will not be fully started for 2 weeks. State average yield 10 bu.

State Crop Report: Soybeans generally mature in southeastern counties and harvesting will be resumed as soon as fields dry. In east central and northeastern areas many fields still green. Dry weather resulted in short pods and small beans in many late fields.

MICHIGAN

A. A. Johnson, farm crops department, Michigan State College, East Lansing: Crop about 20% mature. Not yet frosted. Beans high in moisture. Probably considerable frost damage before mature. Harvesting prospects poor. Yield prospects above normal.

MINNESOTA

N. C. Bieter, Faribault, for south central: Frost Sept. 28, 20-24 degrees. Estimate one-half to two-thirds crop matured before frost. difficult to determine damage. Crop will need at least 3 weeks of good drying weather and no frost to be dry enough to combine. Beans in brown pods still soft. Final yield will depend on weather next 3-4 weeks. We believe adequate storage available.

MISSOURI

Harry A. Plattner, Malta Bend: 80% crop matured before killing frost. 10% damage. Can be saved by artificial drying. Lincolns dropped leaves Sept. 15 and would have been ready to harvest Oct. 1 if weather permitted. Chiefs have started to drop leaves and will be ready to harvest Oct. 15. Other varieties later. All Lincolns will be kept for seed.

E. M. Poirot, Golden City, for southwest: No killing frost. Beans are green and very late. Will require 2 weeks to mature and escape frost.

MISSISSIPPI

L. S. Stoner, Holly Bluff, Miss., for Yazoo County: Maturity little later than normal. Expected per acre yield 35-40 bu. No pest or disease damage.

OHIO

D. G. Wing, Mechanicsburg, for central: If frost holds off 10 days all beans will be ripe. Dry weather in August and September damaged beans 10-20%. Should grade okay if we have dry harvest. Last week in September very wet. Frost will be necessary to kill weeds. We could start combining if it were not for weeds. Yield ahead of last year.

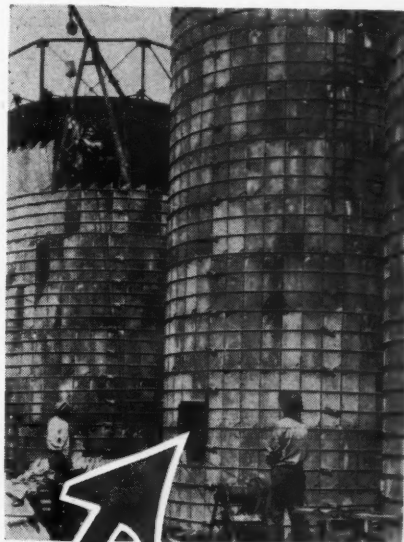
D. F. Beard, agronomy department, Ohio State University, Columbus: Most certified seed fields past danger of frost damage. No frost yet. Leaves yellowing and dropping in nearly all fields. Wet weather early prevented good weed control. Weeds worst they have been in Ohio soybean fields. Early harvest delayed by heavy fall rains which may reduce quality. Most Earlyana fields ready. Yield normal or slightly above.

G. L. McIlroy, Irwin, for south and west central: No frost yet. 50% beyond frost now. If frost holds off another week will be little damage. 10-15% curtailment of crop by drought. Grade will be all right but beans smaller. Harvesting prospects poor at present. Ground is full of water and weather is showery. Average yield probably 18 or 19 bu. Row planted beans generally superior to solid planting. Will be a big increase in popularity of row planting evident next year.

WISCONSIN

Geo. Briggs, agronomy department, University of Wisconsin, Madison: 40-60% crop matured. 25-50% damage if frost in 5 days. Yields cut by slow maturity.

John P. Dries, Saukville, Wis., for south-east Lake shore region: No frost yet. 90% crop matured. Some disease damage. Beans will grade No. 2 and 3. Good weather needed for harvesting. Have had undue rainfall. Yield prospects normal. Writer planted Mukdens. Seem to be 10 days later than Manchu No. 3. Have excellent growth and better pod formation both in size and number per plant. This may be partly due to row planting.



ERECTING BINS FOR SOYBEAN STORAGE

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GRITS and FLAKES...

FROM THE WORLD OF SOY

Seedburo Equipment Co. is now in position to make complete repairs on Tag-Heppenstall moisture meters in Chicago, announces P. W. Burrows, general manager. All such work has been done at the factory in the past. This has greatly inconvenienced users during the busy season.

* * * *

Two personnel changes at the General Mills, Inc. soybean plant in Belmond, Iowa, were recently announced. Bruce P. Neil, former superintendent of milling and extraction, has been advanced to chief engineer of the Belmond plant. He is a veteran in the field of solvent extraction of soybeans. Harold Schmidt, former head miller at General Mills' Kansas City flour mill, has been transferred to Belmond to succeed Neil as superintendent of milling and extraction.

* * * *

A chart, "Directions for Using Lecithin," accompanied the article, "Eighteen Mistakes in the Use of Lecithin," by L. Russell Cook of the W. A. Cleary Corp. in August *Food Industries*. Directions for the use of lecithin in 32 different food products are included.

* * * *

Western Grain & Feed Association is holding its annual convention at Hotel Fort Des Moines in Des Moines, Iowa, November 26-27, Mark G. Thornburg, secretary, announces.

* * * *

W. H. Coultas has been named manager of Allied Mills' new research farm at Chilli-coth, Ill., Dr. J. E. Hunter, director of research for the firm, announces. Building activities will be started as soon as materials are available. A graduate of the University of Illinois college of agriculture, Mr. Coultas has been manager of a 4,000 acre livestock farm in northern Indiana the past 4 years. Previous experience included 2 years with the Illinois Agricultural Association as manager of soybean marketing.

* * * *

American Oil Chemists' Society will hold its customary fall meeting, the 19th, November 7-9 at Hotel La Salle, Chicago. Robert R. King, of the Interstate Cotton Oil Refining Co., Sherman, Texas, is president. Convention chairman is George A. Crapple, Wilson & Co., Chicago. Program is in charge of W. G. Hendrey, Edwal Laboratories, Chicago.

* * * *

Work of the soybean analysis committee of the American Oil Chemists' Society, which was begun in 1936, was described in the September issue of *Oil & Soap* by the chairman, Reid T. Milner of the Northern Regional Research Laboratory, Peoria, Ill., as the sixth of a series about functions of AOCS committees.

* * * *

Preliminary tests show DDT residues placed experimentally in soil retard the growth of soybeans and some other crops, reports Agricultural Research Administration of USDA. Amount used was 25 pounds per acre.

* * * *

Another booklet in an interesting series published by the National Association of Margarine Manufacturers is "The Story of Modern Margarine," using the same bright yellow color that characterizes the Association's advertisements in the *Digest* and other publications.

* * * *

P. E. Sprague, who has been in charge of the Glidden Co.'s sales at Cleveland, has been named vice-president in charge of administration of the soya products division, Chicago, and feed mill division, Indianapolis. W. J. O'Brien is now the chairman of the research and manufacturing committee of the firm.

* * * *

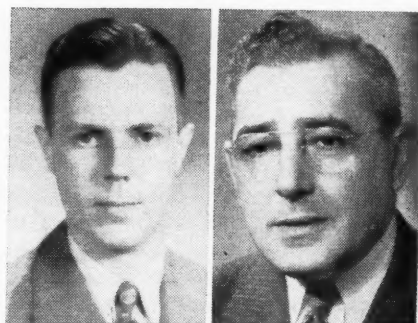
A suitable material for the manufacture of golf ball covers has been patented. It is obtained by oxidizing soybean oil at elevated temperatures until jelled and mixing it with a rubbery gum.

* * * *

Aer-o-foam, which is made from isolated soybean protein, may soon be fighting farm pests as well as the navy fires for which it has become celebrated. Tests of its efficiency as a carrier for insecticides and fungicides are under way. Trials with fog nozzles indicate the idea is practical.

* * * *

Bloomington Bros., Inc., New York City, include soy flour in a fruitcake which the firm packs exclusively for overseas shipment. An inert gas is used for packing to insure safe transit.



DICK TOWNSEND

C. F. MARSH

TWO CHANGES IN GLIDDEN STAFF

Two recent appointments have been announced by the Glidden Co.

P. E. Sprague, vice president at Cleveland, announces that Cecil F. Marsh, sales manager at Indianapolis, Ind., has been advanced to the position of general manager of that division.

This appointment places Mr. Marsh in direct charge of all the firm's feed operations at Indianapolis and includes direct responsibility for all phases of manufacturing, purchasing, sales and uniformity control of Glidden feeds.

Mr. Marsh announces the appointment of Dick Townsend, chemist, who will be in charge of the new laboratory under construction at Indianapolis. He will be responsible for laboratory control and products development for the company's new feed mill division.

Dick Townsend spent 8 years in technical and development work for the Central Soya Co. and McMillen Feed Mills, becoming thoroughly familiar with problems of feed manufacturing, soya and beet sugar operations. He was earlier associated for 4 years with the Kraft Cheese Co.

-s b d-

CONSTRUCTED BY CENTRAL SOYA CO.

The construction of new grain storage bins which will add a 2 million bushel storage capacity to the plant at Decatur, Ind., and one-half million bushels to the storage facilities at the Gibson City, Ill., plant, has been announced by the Central Soya, Co. Inc., of Fort Wayne.

Central Soya is one of the four largest processors of soybeans in America. The added storage capacity will be used both by Central Soya and its subsidiary, the McMillen Feed Mills.

Forty separate tanks, built in units of 10 tanks each, and with a holding capacity of one-half million bushels per unit, will be constructed at Decatur, company officials said. One of the primary reasons, it was pointed out, is to increase facilities

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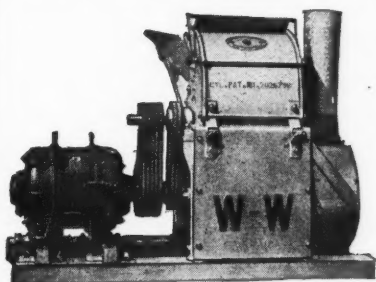
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for handling trucked-in soybeans. Heretofore, the receipt of beans brought to the plant by truck has been severely limited by lack of storage space.

At Gibson City, the company will build 10 new storage bins, 120 feet high and 27 feet in diameter. The bins at Decatur will be 110 feet high and 26 feet in diameter.

Erection of the facilities at Decatur will necessitate the laying of additional railroad tracks and switches, west of the new tanks.

— s b d —

QUARTER CENTURY WITH PURINA CO.

Donald Danforth, president of the Ralston Purina Co., St. Louis, Mo., marked his 25th anniversary with the company recently.

Danforth is a secretary of the American Youth Foundation, secretary-treasurer of the Danforth Foundation, a trustee of Princeton University and Berea (Ky.) College, a member of the board of governors of the Automobile Club of Missouri, and director of the St. Louis Chamber of Commerce, Y. M. C. A., and the First Bank of East Prairie, Mo.

DONALD DANFORTH



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Acreage Goal

If the current preliminary goals discussions of USDA fats and oils branch officials are any criterion, next year's soybean acreage goal will fall between 9 and 10 million acres, and the price support will come between \$1.70 and \$1.75 a bushel. This is the way the 1946 soybean program is now shaping up.

Three main arguments are put forward on the side of somewhat lower soybean acreage and a cut in price support for next year:

(1) The expectation of a considerable volume of South Pacific oils coming into the U. S. by the time next year's soybean crop is crushed.

(2) Estimates that 1946 cottonseed production will considerably exceed this year's output—1.1 billion pounds of cottonseed oil.

(3) Desire of the administration to shave price support expenditures as closely as possible.

There is about 31 cents a bushel subsidy, on the average, in the present \$2.04 price support on soybeans. The fats and oils branch of the new Production and Marketing Administration would like to lower the price support enough to remove this subsidy.

If finally approved, this would bring next year's soybean price down to around \$1.73 a bushel.

Three principal arguments are advanced on the other side in support of a higher price level for soybeans than is now indicated:

(1) Historically, it takes a price ratio of approximately 2 to 1 in favor of soybeans over corn to attract an acreage in the neighborhood of 10 million acres.

(2) Should the parity price level, as some economists predict, go up several points next year due to an increase in the cost of things farmers have to buy, it would throw

the price ratio between corn and soybeans further out of line.

A rise in parity would boost the support (loan) level of corn, but it would have no similar effect on soybeans. A \$1.70 to \$1.75 price support for soybeans would already be well above the mandatory level of 90 percent of parity. Soybean parity on Sept. 15 was \$1.67 a bushel, making the postwar mandatory support, as of that date, \$1.50 a bushel.

(3) Competition from other crops, particularly the new and high-yielding varieties of oats—which can be used as a cover crop for clover in the rotation and which require less labor—would make soybean production less attractive.

You should have the final word on 1946 soybean goal and price support in November.

World Situation

The most authoritative and comprehensive study of the world food situation has just been issued in mimeographed form by the U. S. Department of Agriculture's Office of Foreign Agricultural Relations which has trained observers stationed in all the important agricultural countries of the world.

The report gives this summary view of the world fats and oils situation:

"The world supply of fats and oils, both edible and inedible, will continue short for 1945-'46. In most cases supplies will only be sufficient to meet minimum requirements. Total international trade in fats and oils, exclusive of butter during 1945-'46, is expected to reach 6.5 billion pounds, compared with the prewar level of 9 billion pounds.

"In spite of the liberation of the surplus producing areas of the Far East (formerly contributing about 35 percent of the world trade) the amounts of fats and oils available for 1945-'46 from these areas are expected to be disappointingly low.

By PORTER M. HEDGE

Washington Correspondent for
The Soybean Digest

"While the Western Hemisphere has greatly increased vegetable oil production during World War II, notably soybeans in the United States and sunflower seed in Argentina, the expanded output has not been sufficiently large to compensate for the loss of supplies formerly available from the Pacific and Far East.

"The liberation of Europe in the spring of 1945 has brought about huge requirements for relief. Total output of fats and oils (including butter) is well below the average for the middle thirties, when continental Europe imported a large proportion of its supplies. Throughout the war period, fats and oils were in shorter supply than any major food item . . .

"The greatest uncertainty as to available supplies for 1945-'46 are the recently liberated areas of the Far East. Experience to date with copra in the Philippine Islands indicates that the recovery process will be slow and that a number of months pass before full production is again reached.

"It is believed that a similar situation will prevail in re-establishing the copra and palm oil industries of Malaya and the Netherlands East Indies. Manchurian soybean production is probably at a reduced level, and the disposition of the surplus crop among the Allies is not clear."

Anderson on Soybeans

Secretary of Agriculture Clinton Anderson used development of the soybean industry as the text of a recent speech on agriculture-industry cooperation during the postwar period.

Speaking at a meeting in Decatur, Ill., the soybean capital of the world, Anderson said:

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"The soybean illustrates the harmony that should exist between business and agriculture, and it gives promise of a wonderful future.

"The soybean has made good in a big way. In industrial uses alone we have the basis for a growing industry. Already we have seen some of the possibilities that exist in the making of plastics, fiber fabrics, adhesives, paints and varnishes, linoleum, and printer's ink.

"The Northern Regional Research Laboratory has made such an improvement in the color and taste of soybean protein meal that the results indicate an expansion of the industrial consumption of soybean protein for food as well as for fibers, plastics and paper coatings.

"A waterproof glue for use on plywood has been developed at a cost lower than that of other waterproof glues. This may make it possible for waterproof plywood to come into much greater use in barns, silos, cement forms, storage bins, and houses. And a new rubber substitute has been made with possibilities for use in rubber heels, jar rings, and arch supports.

"These are some of the ways in which the soybean ties together agriculture and industry."

Optimism on Fats

The tight ration grip on fats and oils is beginning to loosen a little, and there is a feeling among USDA supply officials that they aren't in such bad shape on fats and oils as they thought they were a month ago.

This note of optimism is reflected not only in somewhat more liberal fourth quarter quotas of fats and oils for civilian uses, but also in the tendency of commodity officials to drop price supports on vegetable oil crops for next year.

Improvement in fourth quarter supplies is attributed to: (1) cutbacks in military requirements, (2) better than expected seasonal supplies.

Fourth quarter fats and oils quotas were increased on three types of civilian uses: (1) Shortening, cooking and salad oils up from 79 to 88 percent of the 1940-'41 base period, (2) soap, up from 74 to 78 percent, (3) protective coatings — paints, varnish, coated fabrics, floor coverings—up from 45 to 75 percent.

The fourth quarter margarine quota remains the same at 95 percent of the base period.

Marshall Leaves OPA

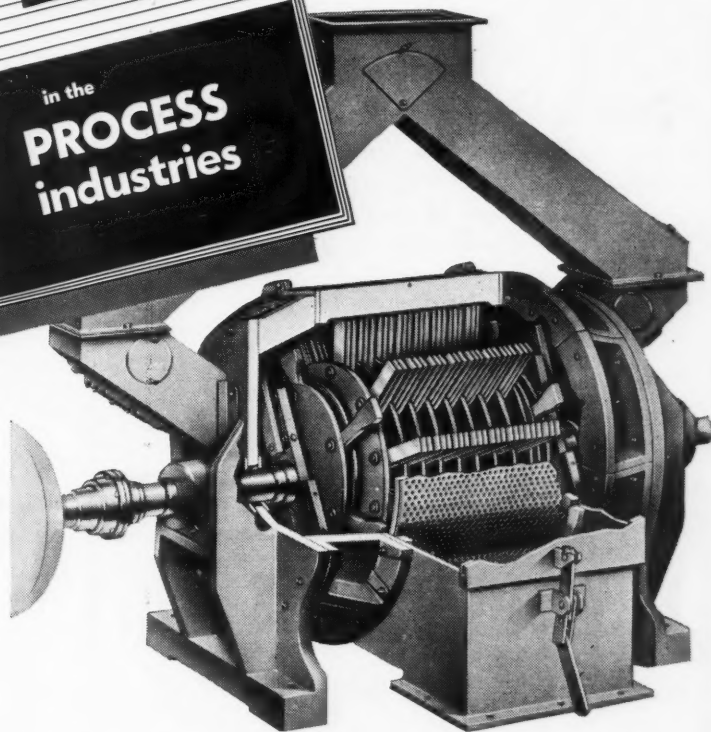
Clive F. Marshall, head of OPA's feeds, seeds, grains and agricultural chemicals branch since December 1944, has resigned, effective October 12, and will return to his home in Barrington, Ill.

Mr. Marshall had no statement to make on his future business plans. He will be succeeded by Ralph Brown, now a section head in the branch.

OCTOBER, 1945

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In The MARKETS

● **SOYBEAN INSPECTIONS.** Inspected receipts of soybeans have shown a seasonal decrease for the past four months, according to inspectors' reports to the Grain Branch of the Production and Marketing Administration. August receipts totaled 1,733 cars compared with 3,063 cars in July, 3,642 in June, 5,953 cars in May, and 6,588 cars in April. Inspected receipts October through August this season were 82,979 cars compared with 81,805 cars during the same period last season.

The quality of the soybeans inspected in August continued good, 89 percent grading No. 2 or better compared with 88 percent in July and 87 percent in June. October through August this season 88 percent graded No. 2 or better compared with 87 percent last season.

Inspections of soybeans in August included the equivalent of 413 cars inspected as cargo lots, and truck receipts equivalent to about 21 cars.

● **SOYBEAN STOCKS.** Production and Marketing Administration commercial grain stock report.

U. S. Soybeans in Store and Afloat at Domestic Markets (1,000 Bu.)

	Sept. 24	Sept. 11	Sept. 28	Sept. 25	Oct. 2
Atlantic Coast	99	99	99	99	
Gulf Coast	609	537	503	457	660
Northwestern and Upper Lake					
Lower Lake	39	21	180		1
East Central	475	405	290	152	74
West Central Southwestern and Western	205	154	107	113	93
Pacific Coast					
Total current week	1427	1216	1179	821	828
Total Year ago	1826	1601	1424	1290	1323

Total North American Commercial Soybean Stocks (1,000 Bu.)

Current week	1427	1216	1179	821	828
Year ago	2086	1861	1684	1550	1517

● **STANDARD SHORTENING SHIPMENTS.** By members of institute of Shortening Mfrs., Inc., in pounds.

August 25	8,125,807
September 1	9,766,682
September 8	7,521,461
September 15	10,235,310
September 22	9,925,809
September 29	9,035,831

● **OILSEED CAKE.** Soybean oil meal market is very tight with some of the large processors out of the market at the present time, reported the Chicago office of the Production and Marketing Administration Oct. 9. Most of the crushers are sold up through December, and others around the clock.

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A tough, versatile adhesive with a thousand uses in the home, in the repair shop and on the farm. Works equally well on clothing, awnings, grain bags, burlap bags, tents, binder canvas, window shades, cotton material, harness, handbags, luggage, suitcases, belts, overshoes, golf bags, footballs, shoes, auto upholstery, furniture and many other items.

EASY TO USE. Just spread a thin coating with a paddle or knife, press pieces firmly together and allow to dry. They will not peel or tear.

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Government Orders

● **QUOTAS FOR FATS AND OILS.** Larger civilian supplies of shortening and cooking oils, of soap, and of oils for protective coatings are announced by Secretary of Agriculture Clinton P. Anderson, under forthcoming amendments to War Food Orders 42, 42a, and 42b.

Effective October 1, the quota for the use of fats and oils in the production of civilian supplies of shortening, cooking and salad oils will be increased from the current 79 percent of average use during the base period 1940-41 to 88 percent. This action, resulting from reduced military requirements and a larger prospective supply of soybean oil than previously estimated, is expected to relieve shortages that have existed in some areas.

The quota for margarine will remain the same as for the third quarter, at 95 percent of the base period.

Secretary Anderson also announced an increase in the quarterly quota of fats and oils which manufacturers may use in the production of civilian supplies of household package and bar soap. Effective October 1, soap manufacturers may increase their use of fats and oils from 74 percent of the quantity used during the average base period 1940-41 to 78 percent.

Also effective October 1, there was an increase from the current 45 percent quota to 75 percent, in the amount of fats and oils manufacturers may use in the production of paints and varnish, coated fabrics, and floor coverings, such as linoleum. The new quota will include all uses listed in WFO 42a, including military needs, except tung oil, which remains quota-exempt. An increased domestic supply of flaxseed, now estimated at approximately 35 million bushels, compared with approximately 23 million bushels in 1944, and reduced military requirements were given as reasons for the increased quotas.

● **SOYBEAN PRICE SCHEDULE.** Same schedule of support prices and of premiums and discounts will prevail for 1945 crop soybeans as for the 1944 crop, announces Commodity Credit Corporation. Base price will be \$2.04 for No. 2 green or yellow soybeans with 14 percent moisture, \$1.84 for brown, black and mixed.

The following premiums and discounts will apply.

TEST WEIGHT— $\frac{1}{2}$ cent per bushel discount for each pound under 54 pounds.

MOISTURE—1 cent premium for each $\frac{1}{2}$ percent under 14 percent down to, and including, 11 percent. $1\frac{1}{2}$ cents per bushel discount for each $\frac{1}{2}$ percent in excess of 14 percent up to, and including 18 percent and 2 cents per bushel for each $\frac{1}{2}$ percent in excess of 18 percent.

SPLITS— $\frac{1}{4}$ cent per bushel discount for each 5 percent or fraction thereof in excess of 15 percent.

DAMAGE OTHER THAN GREEN— $\frac{1}{2}$ cent per bushel discount for each 1 percent in excess of 3 percent, but not in excess of 25 percent. 1 cent per bushel for each 1 percent in excess of 25 percent, but not in excess of 60 percent. $1\frac{1}{2}$ cents per bushel for each 1 percent in excess of 60 percent.

GREEN DAMAGE— $\frac{2}{10}$ cent per bushel discount for each 1 percent of green damage in excess of 3 percent total damage.

DOCKAGE AND FOREIGN MATERIAL—The total weight of foreign material and dockage combined in excess of 2 percent shall be deducted from the total gross weight of soybeans delivered when determining the net number of bushels of soybeans.

● **VEGETABLE OILS.** The U. S. Department of Agriculture has continued through March 31, 1946, the suspension of restrictions on deliveries of crude cottonseed, peanut, soybean, and corn oils to refiners for refining purposes, under War Food Order 29.

Authorizations for delivery of these four crude oils to all other users, however, will continue to be obtained from the Fats and Oils Branch, of the Production and Marketing Administration.



This
you'll want
to see

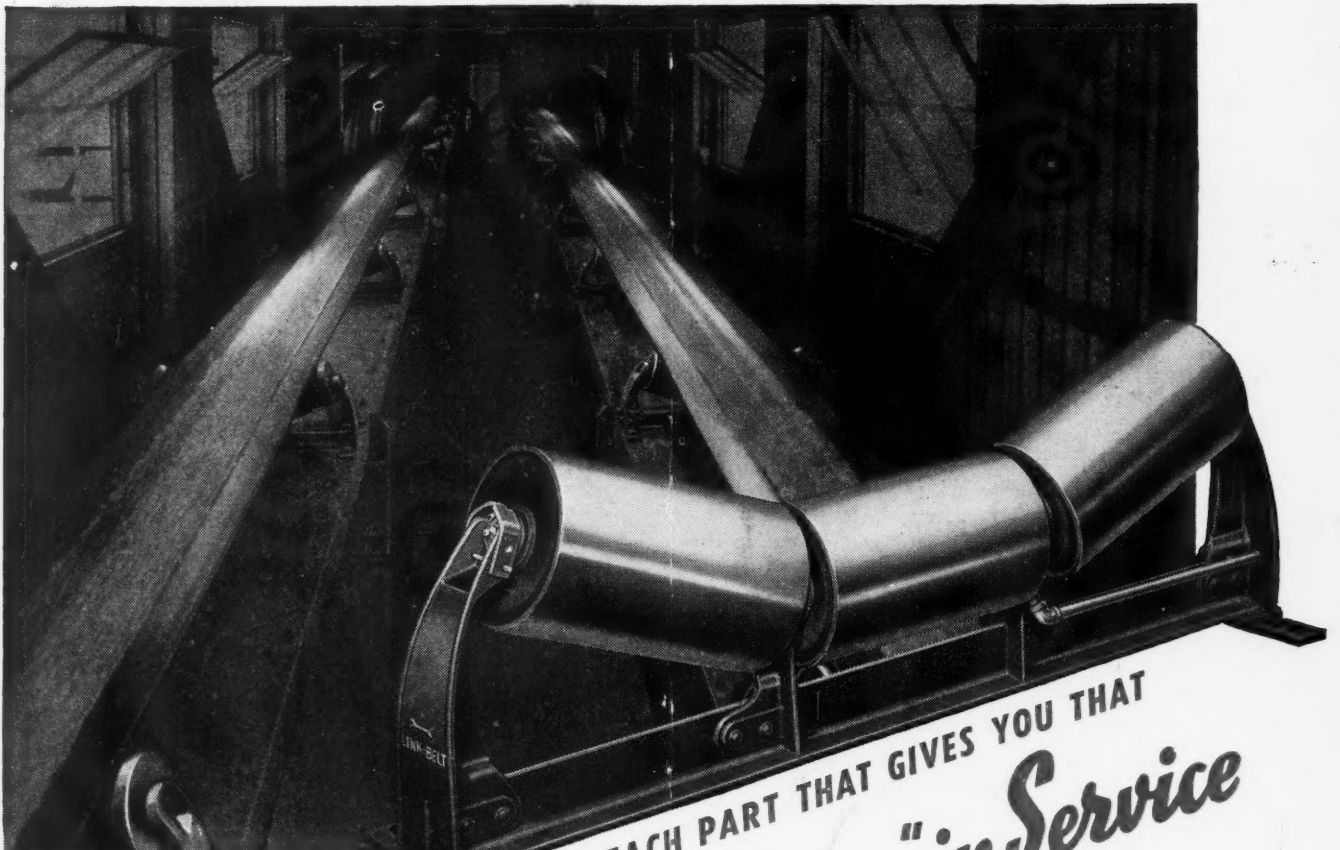
The just-published booklet, "The Story of Modern Margarine" is now being distributed to leading editors and writers of magazines and newspapers, to radio stations and other thought leaders all over America.

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It is one of the things we are doing to educate people on Modern Margarine as a good American food on which unfair restrictions should be repealed.

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**NATIONAL ASSOCIATION
OF MARGARINE MANUFACTURERS
Munsey Building, Washington 4, D. C.**



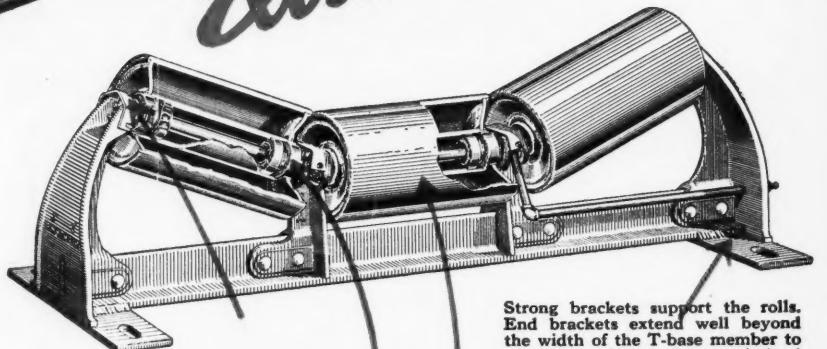
Link-Belt 18" wide anti-friction belt conveyors handling soybeans from storage to bean cleaner machines at A. E. Staley Manufacturing Co. solvent extraction plant, Decatur, Ill. Link-Belt "100" idlers are used with grease pipe extension to one side.

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POSITIVE GREASE SEAL keeps grease in and dirt out—conserves lubrication—prolongs bearing life. No springs, no loose parts, no sliding metal-to-metal contact.

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